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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/343,293	06/30/1999	PENG CHENG	42390.P7068	7737

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EXAMINER

ORTIZ, EDGARDO

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 09/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/343,293

Applicant(s)

Cheng Et.al.

Examiner

Edgardo Ortiz

Art Unit

2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Jun 24, 2002
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 63-90 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 63-90 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Jun 24, 2002 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 6) ☐ Other:

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### **DETAILED ACTION**

This Office Action is in response to a Request for Continued Prosecution and amendment filed June 24, 2002 on which Applicant canceled claims 25-62 and added new claims 63-90.

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b).

Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 63-75 and 77-89 are rejected under 35 U.S.C. § 102 (e) as being anticipated by Son (U.S. Patent No. 6,063,681). With regard to Claim 63, Son teaches a substrate (21), a gate electrode (25) formed over the substrate and defining an underlying channel region in the substrate, a source/drain (30) formed in the substrate adjacent the gate electrode and having an activated

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doped region with a first silicide layer (33) disposed therein and wherein the activated doped region and the first silicide are aligned with a spacer (31) disposed along sidewalls of the gate electrode and the source/drain also having an extension (27) of the activated doped region wherein the extension has less dopant concentration (LDD) than the activated doped region and the extension and a second silicide layer (29) disposed in the extension are aligned with the gate electrode to have the less dopant concentration of the extension reside between the channel region and the activated doped region. See figure 3H.

With regard to Claim 64, Son teaches an activated doped region (30) that is thicker than the extension (27).

With regard to Claim 65, Son teaches a first silicide layer (33) that is thicker than a second silicide layer (29).

With regard to Claim 66, Son teaches an activated doped region (30) and an extension (27) that comprise ion implanted material (N-type impurity ions).

With regard to Claims 67 and 68, Son teaches first (29) and second (33) silicide layers that can comprise either the same or different metals (titanium, nickel, cobalt).

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With regard to Claims 69-73, Son teaches first (29) and second (33) silicide layers that can comprise  $\text{CoSi}_2$ ,  $\text{TiSi}_2$  or nickel silicide.

With regard to Claim 74, Son teaches a barrier layer (26) adjacent the gate electrode (25).

With regard to Claim 75, Son teaches a barrier layer (26) that comprises silicon nitride (column 48-51).

With regard to Claim 77, Son teaches a semiconductor substrate (21), a gate electrode (25) formed over the semiconductor substrate, a source/drain (30) formed in the substrate adjacent the gate electrode and having an activated doped region with a first silicide layer (33) disposed therein and wherein the activated doped region and the first silicide are aligned with a spacer (31) disposed along sidewalls of the gate electrode and the source/drain also having an extension (27) of the activated doped region wherein the extension has less dopant concentration (LDD) than the activated doped region and the extension and a second silicide layer (29) disposed in the extension are aligned with the gate electrode to have the less dopant concentration of the extension reside between the channel region and the activated doped region. See figure 3H.

With regard to Claim 78, Son teaches an activated doped region (30) that is thicker than the extension (27).

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With regard to Claim 79, Son teaches a first silicide layer (33) that is thicker than a second silicide layer (29).

With regard to Claim 80, Son teaches an activated doped region (30) and an extension (27) that comprise ion implanted material (N-type impurity ions).

With regard to Claims 81 and 82, Son teaches first (29) and second (33) silicide layers that can comprise either the same or different metals (titanium, nickel, cobalt).

With regard to Claims 83-87, Son teaches first (29) and second (33) silicide layers that can comprise  $\text{CoSi}_2$ ,  $\text{TiSi}_2$  or nickel silicide.

With regard to Claim 88, Son teaches a barrier layer (26) adjacent the gate electrode (25).

With regard to Claim 89, Son teaches a barrier layer (26) that comprises silicon nitride (column 48-51).

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***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 76 and 90 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Son (U.S. Patent No. 6,063,681). With regard to Claims 76 and 90, Son essentially teaches the claimed invention but fails to show, the extension having a thickness 300-500 angstroms in thickness. It would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by Son to include an extension having a thickness 300-500 angstroms in thickness, in order to control short channel effect and therefore increase the speed of the transistor. Additionally, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

***Response to Arguments***

3. Applicant's arguments with respect to claims 63-90 have been considered but are moot in view of the new ground(s) of rejection.


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*Conclusion*

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Edgardo Ortiz (Art Unit 2815), whose telephone number is (703) 308-6183 or by fax at (703) 308-7724. In case the Examiner can not be reached by a direct telephone call, you might call Supervisor Eddie Lee at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application should be directed to the Group 2800 receptionist whose telephone number is (703) 308-0956.

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9/13/02



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